What Is Claimed Is:

1. A method of manufacturing a semiconductor device comprising:

a first step of laminating an adhesive tape to a back surface of a semiconductor wafer which forms an integrated circuit over a main surface thereof and, thereafter dividing the semiconductor wafer into a plurality of semiconductor chips by dicing; and

a second step of selectively applying vibrations to a semiconductor chip to be peeled among the plurality of semiconductor chips which are laminated to the adhesive tape and the adhesive tape arranged below the semiconductor chip to be peeled so as to peel the semiconductor chips from the adhesive tape,

wherein a frequency of the vibrations is set to a value within a range of 1kHz to 100kHz and an amplitude of the vibration is set to a value within a range of 1 μm to 50 μm.

2. The method of manufacturing a semiconductor device according to claim 1, wherein the vibrations are longitudinal vibrations in a direction perpendicular to a surface of the adhesive tape.

3. The method of manufacturing a semiconductor device according to claim 2, wherein when the vibrations are applied to the adhesive tape, a tension in a horizontal direction with respect to a surface of the adhesive tape is applied to the adhesive tape.

4. The method of manufacturing a semiconductor device according to claim 1, wherein a thickness of the semiconductor chip is equal to or less than 100μm.

5. A manufacturing method of a semiconductor device comprising the steps of:

(a) preparing a semiconductor wafer having an integrated circuit formed over a main surface thereof as well as an adhesive tape having a diameter larger than a diameter of the semiconductor wafer and having a surface over which an adhesive agent is applied;

(b) laminating the adhesive tape to a back surface of the semiconductor wafer and, thereafter, dividing the semiconductor wafer into a plurality of semiconductor chips by dicing; and

(c) peeling the semiconductor chips from the adhesive tape in such a manner that a vibrator is brought into contact with a back surface of the adhesive tape while applying a tension in a horizontal direction to a surface of the adhesive tape to which the plurality of semiconductor chips are laminated, and longitudinal vibrations having a frequency which a range of 1 kHz to 100 kHz and an amplitude within a range of 1 μm to 50 μm are applied to semiconductor chips to be peeled off out of the plurality of semiconductor chips and the adhesive tape disposed below the semiconductor chips by way of the vibrator.

6. The manufacturing method of a semiconductor device according to claim 5, wherein the vibrator is operated prior to the step of bringing the vibrator into contact with the back surface of the adhesive tape.

7. The manufacturing method of a semiconductor device according to claim 5, wherein when the longitudinal vibrations are applied to the semiconductor chip and the adhesive tape below the semiconductor chip, a collet is brought into contact with a main surface of the semiconductor chip to be peeled.

8. The manufacturing method of a semiconductor device according to claim 5, wherein after applying the longitudinal vibrations to the semiconductor chip and the adhesive tape below the semiconductor chip, the semiconductor chip is held and is pulled upwardly by the collet and operation of the vibrator is stopped simultaneously.

9. The manufacturing method of a semiconductor device according to claim 5, wherein an area of a portion of the vibrator which is brought into contact with the back surface of the adhesive tape is set smaller than an area of the semiconductor chip.

10. The manufacturing method of a semiconductor device according to claim 5, wherein the adhesive agent applied to the adhesive tape is an ultraviolet-ray curing type adhesive agent, and the manufacturing method further includes a step of irradiating the adhesive tape with ultraviolet rays so as to decrease an adhesive strength of the adhesive tape after dividing the semiconductor wafer into the plurality of semiconductor chips by dicing and prior to the step of bringing the vibrator into contact with the back surface of the adhesive tape.

11. The manufacturing method of a semiconductor device according to claim 5, wherein the manufacturing method further includes a step of mounting the semiconductor chip over a chip

mounting board after the step (c).

12. The manufacturing method of a semiconductor device according to claim 5, wherein a thickness of the semiconductor chip is set equal to or les than 100μm.

13. The manufacturing method of a semiconductor device according to claim 5, wherein after applying the longitudinal vibrations to the semiconductor chip and the adhesive tape below the semiconductor chip, the operation of the vibrator is stopped upon detection of a change of impedance of the vibrator.